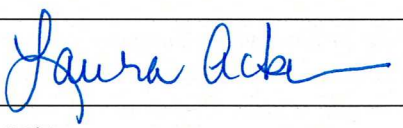
Quality Assurance Project Plan
U.S. Environmental Protection Agency

Science and Ecosystem Support Division
980 College Station Road
Athens, GA 30605

SESD Project ID No.: 15-0346
SESD Category 3 QAPP

SECTION A: Project Planning Elements		
A1. Title (*Project Name*):	Smokey Mountain Smelters	
Project Location:	1508 Maryville Pike Knoxville, Tennessee	
Project Requestor and Organization:	Scott Miller, Remedial Project Manager, Region 4 Superfund Division	
Project Leader's Name, Position and Organization:	Kevin Simmons, Life Scientist USEPA Science & Ecosystem Support Division (SESD)	
Project Leader's Signature:		Date: 6/30/2015
Technical Reviewer's Name and Position:	Brian Striggow, Environmental Engineer	
Technical Reviewer's Signature:		Date: 6/30/2015
Section Chief's Name and Position:	Laura Ackerman, Chief, Superfund and Air Section	
Section Chief's Signature:		Date: 7/1/15
A2. Table of Contents	N/A	
A3. Distribution List	Scott Miller	

A4. Project Personnel	**Organization**	**Responsibilities**
Kevin Simmons	US EPA SESD	Project Leader/Sampler
Brian Striggow	US EPA SESD	Sampler/Safety Officer
Art Masters	US EPA SESD	Sampler
Don Fortson	Alion Science Inc (ESAT)	Instrument Cal/Sampler
Stephen Camp	Alion Science Inc (ESAT)	Instrument Cal/Sampler
Louie Pounds	Alion Science Inc (ESAT)	Field Chemist

A5. Problem Definition (Investigation Objectives and Background Information):

The background and site status information below is taken from the EPA Region 4 Superfund website (see link below).
(http://www.epa.gov/region4/superfund/sites/npl/tennessee/smokmtsmtn.html#progress)

Site Status

The Smokey Mountain Smelters site is the location of former fertilizer and smelting operations. EPA placed the site on the National Priorities List (NPL) in 2010 because of contaminated soils, sediment and surface water resulting from past industrial operations at the site. EPA and the Tennessee Department of Environment and Conservation (TDEC) have investigated site conditions and taken steps to clean up the site in order to protect people and the environment from contamination. In 2008, EPA repaired the fence surrounding the site. In 2010, EPA demolished vacant on-site buildings. In 2011, EPA removed a portion of on-site waste and capped the rest. EPA continues to stabilize the top layer of the cap with grass. EPA and TDEC continue to monitor site conditions and investigate whether contamination on site could potentially threaten people living and working near the site. Once this investigation is completed, EPA will issue a cleanup plan (a Record of Decision, or ROD) to address all remaining contamination. EPA continues to update residents about the site by issuing fact sheets and related information about the progress of the site investigation.

Background

The site is located at 1508 Maryville Pike in Knoxville, Tennessee, four miles south of downtown Knoxville in a mixed industrial, commercial and residential area. A low-income apartment complex (Montgomery Village) is located to the south, within 75 feet of the site. The complex houses about 560 residents. Some single-family homes are also located nearby. The apartment complex includes recreational and playground areas and a daycare facility. Undeveloped property is located west of the site. Additional single-family homes are located to the east of the site and commercial and industrial properties are located to the north. The site is fenced and graded. EPA is working to establish grass on the site.

A series of fertilizer and agricultural chemical companies operated at the site from the 1920s to the 1960s. Smokey Mountain Smelters, also known as Rotary Furnace, Inc., operated at the site from 1979 to 1994. The facility was a secondary aluminum smelting operation. The process involved the melting of scrap aluminum and aluminum dross, a smelting waste by-product, and casting the molten aluminum metal bars. Raw materials at the facility primarily consisted of scrap aluminum and aluminum dross. Waste material from the operation was primarily saltcake, a residue with high salt and low metal

content from dross smelting. Other waste materials included baghouse dust and discarded aluminum dross.

In 1983, the State of Tennessee's Division of Solid Waste Management issued a notice to Smokey Mountain Smelters after concluding that the site was "unsuitable for use as an industrial landfill." However, landfilling continued to occur on site for several years. In addition, the Knox County Department for Air Pollution Control documented numerous citizen complaints regarding excessive air emissions from the site and cited Smokey Mountain Smelters for several air quality violations in the 1980s.

Current Information

EPA contractors have conducted groundwater sampling of the monitoring wells in June 2012, November 2013, March and June 2014. Metals data from those events have been downloaded from the EQuIS database and will be used as a reference. Analytical results from past sampling events indicate that investigation derived waste (IDW), purge water from certain monitoring wells, may contain hazardous levels of contaminants and will need to be containerized until current analytical results are obtained. See site map **Figure 1**.

Objectives

The following objectives for this sampling event were provided by Tennessee Department of Environment and Conservation (TDEC) Division of Remediation personnel.

TDEC is interested in additional analysis of the ground water at this site in order to determine the natural buffering capacity of the aquifer. One of the proposed remedies for the metals contamination in the ground water is to inject sodium bicarbonate. However, TDEC feels that the requirement for this remedial action might not be necessary if the ground water is sufficiently buffered by the limestone bedrock of the aquifer. Therefore we have requested the CaCO3, hardness & alkalinity analysis to provide data on the natural conditions of the aquifer. Also, ammonia is present in aluminum dross which is in the wastes that were disposed of at this site; and ammonia breaks down into nitrate/nitrite. Furthermore, past industrial practices at this site included the manufacture of fertilizers. TDEC believed that this included ammonium nitrate and phosphorous/orthophosphate fertilizers. Therefore, analysis for these constituents is appropriate. Additionally, the aluminum salt cake waste that was generated at this site by the reprocessing of the aluminum dross contains elevated chlorides. Prior to the interim action by the ERRB, one could delineate the extent of downstream impact to surface water by measuring the conductivity of the stream.

A6. Project Description:

The RPM requested that SESD collect groundwater samples from the 15 monitoring wells on site plus two or three surface water samples from the capped area if flowing water is observed. **Table 1** lists the wells to be sampled along with well construction details.

Table 1
Well Construction Details Smokey Mountain Smelters Knoxville, Knox County, Tennessee

Well ID	Well Dia (in)	Geology of Screened Interval	Reported Total Depth (ft bgs)	Water Level Range TOC(ft)	Screen Interval (ft bgs)
MW01A	2	Clayey silt	40	28.94-36.91	30 - 40
MW02A	2	Waste material	28	14.05-16.59	15 - 25
MW03B	2	Shale and limestone	66	31.75-37.77	55.8 - 65.8
MW04A	2	Silty clay	43	34.41-40.85	33 - 43
MW07A	2	Sandy clay with gravel	23.5	14.75-21.47	13 - 23
MW07B	2	Dolomitic limestone	40	16.48-23.00	28.8 - 39.8
MW08A	2	Sandy clay with gravel	37.5	20.01-26.00	20 - 35
MW10A	2	Clay with chert gravel	32	18.51-29.46	20 - 30
MW10B	2	Limestone with shale	70	18.04-29.41	59.8 - 69.8
MW11A	2	Weathered sandstone	30.4	3.58- 7.71	15.4 - 30.4
MW11B	2	Sandy shaley limestone & sandstone	57	5.64- 6.91	41.93 - 56.93
MW12A	2	sandy clay and limestone	40	30.48-37.00	23.27 - 39.27
MW12B	2	limestone with shale	62	30.29-36.92	46.69 - 61.69
MW13A	2	clay with shale	30.5	20.10-30.00	14.97 - 29.97
MW13B	2	Shaley limestone	72	25.79-43.07	56.17 - 71.17

Notes
ft = feet
bgs = below ground surface
TOC - top of casing

The water level will be measured and the purge volume calculated for each well to be sampled. The wells will be purged and sampled per SESDPROC-301-R3, Sections 3.2.2 "Tubing-in-Screened-Interval" method, 3.3.1 "Wells Without Plumbing or In-Place Pumps", 4.3.1.1 "Peristaltic Pump, Direct from Pump Head Tubing", and 4.3.1.3 "RediFlo2® Electric Submersible Pump (with Teflon® Tubing)". Bailers, if necessary, will be used per Section 4.3.1.4. Any deviations from these procedures will be documented in the field logbooks.

Field chemical parameters will be recorded until stabilization occurs which will be when, for at least three consecutive measurements, the pH remains constant within 0.1 Standard Unit (SU), specific conductance varies no more than approximately 5 percent, and the turbidity has either stabilized or is below 10 Nephelometric Turbidity Units (NTUs). The temperature will be recorded, but will not be used to determine stability during well purging. Dissolved oxygen (DO) will also be recorded, but will not used as a purge adequacy parameter. DO measurements will be conducted using either a flow-through cell or an over-topping cell to minimize or reduce any oxygenation of the sample during measurement. Oxidation Reduction Potential (ORP) will be recorded, but will not be used as a purge stabilization parameter.

Applicable regulatory information, action levels, etc.	US EPA Primary Drinking Water Standard Maximum Contaminant Levels (MCL), May 2009.
Decision(s) to be made based on data:	TDEC is interested in additional analysis of the ground water at this site in order to determine the natural buffering capacity of the aquifer. One of the proposed remedies for the metals contamination in the ground water is to inject sodium bicarbonate. However, TDEC believes that the requirement for this remedial action might not be necessary if the ground water is sufficiently buffered by the limestone bedrock of the aquifer.
Field Study Date:	July 13-17, 2015
Projected Lab Completion Date:	August 17, 2015
Projected Final Report Completion Date:	September 16, 2015

A7. Quality Objectives and Criteria

All samples/sample locations meet the field investigation objectives and purposes summarized in Sections A5 and A6 of this QAPP.

A8. Special Training/Certifications

N/A.

A9. Documents and Records

For this project, SESD will implement the following procedures pertaining to Documents and

Records:
SESD Operating Procedure for Report Preparation and Distribution, SESDPROC-003-R5.
SESD Operating Procedure for Logbooks, SESDPROC-010-R5.
SESD Operating Procedure for Control of Records, SESDPROC-002-R6.

SECTION B: Data Generation and Acquisition

B1. Sampling Design

The following matrix lists the proposed numbers and types of samples to be collected. Sample locations are described in Section A6 of this QAPP.

Media:	Number of Samples:	Analyses:
Water	22	Total Metals Nitrogen Series (NO_3/NO_2, Ammonia, Phosphorus) Sulfate, Chloride, Alkalinity, Total Organic Carbon Sulfide (field chemistry)

B2. Sampling Methods, General Procedures

The following SESD field measurement and sampling procedures will be followed during this field study, as applicable:

SESDPROC-100-R3	Field pH
SESDPROC-101-R5	Field Specific Conductance
SESDPROC-102-R4	Field Temperature
SESDPROC-103-R3	Field Turbidity
SESDPROC-105-R2	Groundwater Level and Well Depth
SESDPROC-106-R3	Field Dissolved Oxygen (DO)
SESDPROC-113-R1	Field Oxidation-Reduction Potential (ORP)
SESDPROC-201-R3	Surface Water Sampling
SESDPROC-202-R3	Management of Investigation Derived Waste (IDW)
SESDPROC-203-R3	Pump Operation
SESDPROC-205-R2	Field Equipment Cleaning & Decontamination
SESDPROC-209-R3	Packing, Marking, Labeling & Shipping of Environmental & Waste Samples
SESDPROC-301-R3	Groundwater Sampling

B3. Sampling Handling and Custody

All samples will be collected and handled according to the procedures listed in Section B2 of this QAPP. After collection, samples will managed according to the following:

SESD Analytical Support Branch Laboratory Operations and Quality Assurance Manual, Effective Date: April 2015.
SESD Operating Procedure for Sample and Evidence Management, SESDPROC-005-R2.
SESD Operating Procedure for Packing, Labeling and Shipping of Environmental and Waste Samples, SESDPROC-209-R3.

B4. Analytical Methods

The following is a brief description of the analytical methods for this field investigation.

SESD:	Samples will be analyzed in accordance with the *SESD Analytical Support Branch Laboratory Operations and Quality Assurance Manual*, Effective Date April 2015.
CLP:	N/A
Other:	Sulfide: Hach Method 8131 by Alion Science personnel.

B5. Quality Control

The following is a brief description of field and laboratory quality control measures to be implemented during this field investigation.

Field:	Field quality control measures will be in accordance with the *SESD Operating Procedure for Field Sampling Quality Control,* SESDPROC-011-R4, and/or *40 CFR Part 136.3, Table II-Required Containers, Preservation Techniques, and Holding Times* (most recent version), as applicable. The number and type of field quality control samples proposed for this investigation are as follows: 1 MS/MSD per 20 samples 1 Split/Duplicate per 20 samples 1 Equipment Rinse Blank 1 Portable Water System Blank
Laboratory:	SESD Laboratory: Laboratory quality control measures for samples analyzed by the SESD laboratory are specified in the *SESD Analytical Support Branch Laboratory Operations and Quality Assurance Manual*, Effective Date April 2015.

	CLP Laboratories: N/A Field Chemistry: Sulfide QC Requirements CCS – Calibration Check Standard: 1/10 field samples (CSS +/- 10%) CRD – Second Source Quantitation Limit Check: 1/day (CRD +/- 30%) LMB – Lab Method Blank: 1/10 field samples (LMB < reporting limit) LD – Lab Duplicate: 1/10 field samples (LD <20% RPD) MS/MSD: 1/10 field samples (MS/MSD 60-125% recovery)

B6. Instrument/Equipment Testing, Inspection and Maintenance

All field measurement instruments and equipment will be maintained in accordance with the *SESD Operating Procedure for Equipment Inventory and Management,* SESDPROC-108-R4.

B7. Instrument/Equipment Calibration and Frequency

All field measurement instruments and equipment are calibrated according to the *SESD Operating Procedure for Equipment Inventory and Management,* SESDPROC-108-R4 and according to specific procedures included within the defined operating procedures for each instrument (see specific field measurement procedures in Section B2 of this QAPP).

B8. Inspection/Acceptance for Supplies and Consumables

All critical supplies and consumables for this field investigation are inspected and maintained in accordance with the following procedures:

SESD Operating Procedure for Purchasing of Services and Supplies, SESDPROC-015-R4.
SESD Operating Procedure for Equipment Inventory and Management, SESDPROC-108-R4.
SESD Operating Procedure for Field Sampling Quality Control, SESDPROC-011-R4.

The SESD Field Quality Manager and the Branch Quality Assurance Officers are responsible for ensuring that these requirements are met.

B9. Non-direct Measurements: N/A for this category.

B10. Data Management

The field project leader will be responsible for ensuring that all requirements for data management are met. All data generated for this field investigation, whether hand-recorded or recorded and stored in an electronic data logger will be recorded, stored and managed according to the following procedures:

SESD Operating Procedure for Control of Records, SESDPROC-002-R6.
SESD Operating Procedures for Logbooks, SESDPROC-010-R5.

SECTION C: Assessment/Oversight and SECTION D: Data Validation/Usability

The SESD *Field Branches Quality Management Plan* (QMP) and the SESD Operating Procedures address the Assessment/Oversight and Data Validation/Usability elements as required. Please consult those documents for more detailed information concerning the SESD Field Branches Quality System.

****Footnotes**: This Quality Assurance Project Plan (QAPP) has been prepared and approved according to the EPA *Requirements for Quality Assurance Project Plans (EPA QA/R5 EPA/240/B-01/003)*, U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC, March 2001(USEPA, 2001). This document will be used to ensure that the environmental data collected for this project are of the type and quality for the intended purposes. **This document is for SESD use only.**

Figure 1 Smokey Mountain Smelters Well Locations

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